

## Media release

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### Technology Briefing on «Functional Coatings»

## Functional Coatings in Industry and Research

**The Technology Briefing on the topic of «Functional Coatings for Innovative Applications» recently held at Empa was dedicated to the numerous applications of a wide range of coatings and surfaces. Just how multifaceted these applications can be was demonstrated by diverse companies which presented their activities in this area. Empa's planned «Swiss Coating Centre», which is intended to accelerate technology transfer between research and industry in this field (which is of vital importance for Switzerland) was also introduced.**

Specially created functional surfaces, known as «coatings» in technical jargon, are intended to modify the physical or chemical properties of the material on which they are deposited, or to lend them additional ones. These may be, for example, hardness, optical characteristics, electrical conductivity, adhesive properties and so on. In terms of coating technologies Switzerland is one of the leading countries worldwide – for example 80% of all hard coatings are manufactured by Swiss companies. "Unfortunately this leading position is not reflected adequately in the academic world," maintains Alex Dommann, head of Empa's «Materials meet Life» laboratory. The institution is therefore keen on establishing the «Swiss Coating Centre» in the near future, in collaboration with partners from industrial and research organizations. The aim is to bring together all the different parties involved in the field.

### «Swiss Coating Centre» to encourage more efficient technology transfer

On the one hand, the very latest research results hot from the laboratory must be "handed over" as quickly and directly as possible to collaborating industrial partners in order that they may use them to create innovative products and technologies. As these new products establish themselves on the market, they help ensure that their manufacturer enjoys a commercial advantage over the international competition. The «Swiss Coating Centre» has set itself the aim of bringing together all the various interested parties from research and industrial areas involved in this field. While the research scientists focus on developing new processes or optimizing existing ones, what industry is looking for is a high level of reliability and a long service lifetime for their products. "The advantages of working together with Empa are fairly clear," Dommann is convinced, based on the fact that the institution possesses not just the infrastructure but also the know-how involved in complex material technologies and analyses, as well as computer simulations.

On the other hand, the planned centre also intends to offer training and further education courses on the subject of surface coating technologies. "All over the world this field is a growth area, and already there is a lack of specialists and professionals with expert knowledge. By offering practical training and high level education courses we will be directly supporting the industry," Dommann adds.

A range of coating processes are already being investigated at Empa, and their use in such applications as solar cells, motor parts and medical implants has been under study for some time. One of the newest developments in this context is a transparent electrode which can, for example, be used in the manufacture of electronic newspapers or solar cells.

### **Practical examples from industry and research**

The different types of coatings, and the multitude of opportunities which they offer, are reflected in the wide range of industrial applications which were presented during the Technology Briefing. For example, the Italian «Centro Sviluppo Materiali S.p.A.» has developed surface coatings which are capable of withstanding very high loads, made by a thermal spraying process during which a flame is applied to the surface of the material. These coatings are primarily ceramic-based and are used, for example, to create heat shields for rockets and space vehicles. Dow Europe GmbH specializes in plastic coatings which are used to create self-cleaning glass and cement, water and dirt-repellent cars, hydrophobic and oil-repellent electronics, as well as printable and non-adhesive packaging materials. The Paul Scherrer Institute (PSI) has developed thin, flexible oxide films for solar cell applications, and the EPFL's Powder Technology Laboratory is working on coatings both made of, and for, nanoparticles. The applications for the latter are mainly to be found in the medical field – medicines can be coated with nanoparticles, for example, so that they are taken up by and transported around the body.

The Technology Briefing gave the hundred or so specialists drawn from research and industry the opportunity to exchange ideas, hold discussions and network with colleagues. In the course of the event it became clear that thanks to sophisticated treatment techniques, in combination with the appropriate coating processes and the choice of the right materials, a great deal could be achieved which was previously considered impossible.

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### **Further information**

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At the Technology Briefing, Empa and its partners presented a range of different coating technologies with which materials can be "functionalized", that is, lent new properties. (Left to right: Mario Tului (Centro Sviluppo Materiali S.p.A.), Alex Dommann (Empa), Heinrich Hofmann (EPFL), Margarethe Hofmann (MatSearch Consulting Hofmann), Thomas Lippert (Paul Scherrer Institute), Rudolf Koopmans (Dow Europe GmbH).

The photograph above can be downloaded from <http://flic.kr/p/jK94Uj>